



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named
Inventor : Richard A. Meyer et. al.

Appln. No. : 10/017,740

Filed : December 14, 2001

For : MULTI-AXIS LOAD CELL

Docket No.: M93.12-0247

Group Art Unit: 2855

Examiner: L. Martir

2855
Election
A
9-16-03
JLM

RESPONSE TO RESTRICTION REQUIREMENT

Commissioner for Patents
Washington, D.C. 20231

I HEREBY CERTIFY THAT THIS PAPER IS BEING
SENT BY U.S. MAIL, FIRST CLASS, TO THE
ASSISTANT COMMISSIONER FOR PATENTS,
WASHINGTON, D.C. 20231, THIS

8 DAY OF September, 2003

PATENT ATTORNEY

Sir:

In response to the Restriction Requirement mailed
August 15, 2003, please amend the application as follows:

RECEIVED
SEP 12 2003
TECHNOLOGY CENTER 2800

1. A load cell comprising:
 - a first sensor support assembly and a second sensor support assembly, each sensor support assembly comprising an assembly having:
 - a rigid central hub having an end plate and a support element extending transversely from the end plate; and
 - a rigid annular ring concentric with the central hub;
 - a mount joined to the end plate of the first sensor support assembly, the mount being spaced apart from and extending in the same direction as the support element of the first sensor support assembly;
 - a first plurality of sensing devices operably coupled between the support element of the first sensor support assembly and the corresponding annular ring;
 - a second plurality of sensing devices operably coupled between the support element of the second sensor support assembly and the corresponding annular ring; andwherein the end plates of the first and second sensor support assemblies are joined together.
2. The load cell of claim 1 wherein the central hub, annular ring and sensing devices of each sensor support assembly are integral.
3. The load cell of claim 2 wherein each sensing device comprises an integral radial tube with sensors operably coupled thereto.
4. The load cell of claim 3 wherein each sensor support assembly includes an integral flexure member extending between an

end of each radial tube to at least one of the annular ring and central hub, the flexure member being compliant for displacements of each corresponding radial tube along the corresponding longitudinal axis.

5. The load cell of claim 2 wherein each sensor support assembly includes a flexure member for each sensing device, the flexure member being formed integral with at least one of the annular ring and central hub, the flexure member being compliant for displacements of each sensing device along the corresponding longitudinal axis.

6. The load cell of claim 1 wherein the end plates of the first and second sensor support assemblies are integral.

7. The load cell of claim 1 and further comprising:
a second mount joined to the end plate of the second sensor support assembly, the second mount being spaced apart from and extending in the same direction as the support element of the second sensor support assembly.

8. The load cell of claim 7 wherein each end plate, the first-mentioned mount and the second mount include a bore, the bores being aligned to form a common bore through the load cell.

9. The load cell of claim 8 and further comprising:
a first bearing mounted in the first mount;
a second bearing mounted in the second mount;
a shaft supported by the first and second bearings extending through the common bore.

10. The load cell of claim 7 and further comprising:

- a first passageway in the first mount fluidly coupled to a fluid source and adapted to receive a cooling fluid;
- a second passageway in the second mount fluidly coupled to the fluid source and adapted to receive the cooling fluid.

11. The load cell of claim 1 and further comprising an insulating element disposed between the first mount and the end plate of the first sensor support assembly.

Cancel claims 12-28.

29. (New) A load cell body comprising:

- a first sensor support assembly and a second sensor support assembly, each sensor support assembly comprising an assembly having:

- a rigid central hub having an end plate and a support element extending transversely from the end plate; and

- a rigid annular ring concentric with the central hub;

- a mount joined to the end plate of the first sensor support assembly, the mount being spaced apart from and extending in the same direction as the support element of the first sensor support assembly;

- a first plurality of sensing structures joined to the support element of the first sensor support assembly and the corresponding annular ring;

- a second plurality of sensing structures joined to the support element of the second sensor support assembly and the corresponding annular ring; and

wherein the end plates of the first and second sensor support assemblies are joined together.

30. (New) The load cell body of claim 29 wherein the central hub, annular ring and sensing structures of each sensor support assembly are integral.

31. (New) The load cell body of claim 30 wherein each sensing structure comprises an integral radial tube with sensors operably coupled thereto.

32. (New) The load cell body of claim 31 wherein each sensor support assembly includes an integral flexure member extending between an end of each radial tube to at least one of the annular ring and central hub, the flexure member being compliant for displacements of each corresponding radial tube along the corresponding longitudinal axis.

33. (New) The load cell body of claim 30 wherein each sensor support assembly includes a flexure member for each sensing structure, the flexure member being formed integral with at least one of the annular ring and central hub, the flexure member being compliant for displacements of each sensing structure along the corresponding longitudinal axis.

34. (New) The load cell body of claim 29 wherein the end plates of the first and second sensor support assemblies are integral.

35. (New) The load cell body of claim 29 and further comprising:

a second mount joined to the end plate of the second sensor support assembly, the second mount being spaced apart from and extending in the same direction as the support element of the second sensor support assembly.

36. (New) The load cell body of claim 35 wherein each end plate, the first-mentioned mount and the second mount include a bore, the bores being aligned to form a common bore through the load cell.

37. (New) The load cell body of claim 36 and further comprising:

- a first bearing mounted in the first mount;
- a second bearing mounted in the second mount;
- a shaft supported by the first and second bearings extending through the common bore.

38. (New) The load cell body of claim 35 and further comprising:

- a first passageway in the first mount fluidly coupled to a fluid source and adapted to receive a cooling fluid;
- a second passageway in the second mount fluidly coupled to the fluid source and adapted to receive the cooling fluid.

39. (New) The load cell body of claim 29 and further comprising an insulating element disposed between the first mount and the end plate of the first sensor support assembly.